REMARKS

In light of the examiners reasoning the election of Group I, claims 1-12 with traverse, pursuant to a conversation with Examiner on 6/05/03, is acknowledged, but is challenged. Applicant does not accept withdrawal of claims 13-15, and offers remarks below to challenge the assumptions for separateness of each of the groups.

The title has been amended to more clearly describe the invention, and the description of figure 3 is amended to describe all numbers, and the description has been amended to include mention of all drawing numbers and to mention the newly added features of Figure 4. Proposed drawing changes to figure 4 are also enclosed, amended so as to show all the features of the claimed invention.

Claim 8 has been amended to more clearly describe how the recited elements cooperate with each other, thus removing the 35 USC 112 rejection.

Claim 1 has been slightly modified to reflect the fact that the partially diffusing optical fiber must have a protective layer, of some sort, as its outermost layer in order for the fiber to be employable in real world applications.

Examiner contends that the present invention is obvious over Bernasson (5,737,472) in view of Berkey (6,044,191) and Kouichi (4,587,065). Applicant disagrees as described below largely because it is appears that the examiner does not fully understand the differences between an optical fiber produced in line, i.e. as it is drawn from a melted zone, versus one modified off line, i.e. after being collected/spooled and moved to another semi-continuous modification line. Those skilled in the art of optical fiber manufacture recognize especially the great loss in strength and reliability for an optical fiber whose silica outer surface has flaws while exposed to normal environmental conditions. It is extremely difficult to handle, that is spool-up and string another line, optical fiber without a protective coating on the optical fiber. Routinely to this day, unprotected optical fiber can generally be handled only in relatively short lengths, e.g. a meter or two, even with somewhat heroic means. What this means is that the optical fiber, which can be modified in line during its production and have applied its protective coating before the fiber's sensitive surfaces are exposed and their strength compromised by environmental conditions, primarily moisture, will be measurably stronger, more predictable and more reliable than a fiber modified off line.

The present invention is not obvious because none of the cited art as combined teaches or implies a method or apparatus for effectively imparting light diffusing properties to optical fibers during the draw process. Bernasson describes methods such as sandblasting, purported to be useful for pre-made, solid fiber materials, that could severely damage fiber even in sections not specifically treated because in order to localize the particles, the fiber in the sandblasting section would need to be isolated from the rest of the fiber. However, for an in-line application the fiber surfaces before and after the modification zone cannot be touched because they are not protected yet leading to severe mechanical and reliability consequences. Berkey and Kouichi describe in-line methods, but neither is a method for rendering fibers partially illuminating. Thus, there is no teaching or implication in any of these references of how or what treatment could render a fiber partially illuminating and be performed during its initial manufacture.

As a first point, trying to treat with the Bernasson methods while the fiber is still in contact with a molten state, as is described in Berkey and Kouichi, would be extremely detrimental to the process described in Bernasson. The preferred method in Bernasson is sandblasting applied to solid fiber material. The molten section of the fiber being drawn would become severely deformed by such violent processes as sandblasting downstream and likely would break creating a stoppage in drawing and the need to restart the draw process. Recall that the fiber cannot be "held" in the solid form in the area around the Bernasson modification process without damaging its surface and thus seriously compromising its eventual strength and fatigue resistance. Thus, treating the fiber during the draw process, as is taught by Berkey and Kouichi, would be detrimental to the method and apparatus of Bernasson, and to the properties of the modified optical fiber formed thereby.

Berkey does not disclose any method or apparatus for creating partially diffusing optical fibers, but rather discloses an apparatus and method for creating dispersion managed single-mode fibers by varying the fiber thickness or altering the index of refraction. The aim is to maintain a desired dispersion profile within the single-mode fiber core. This brings up another key problem with trying to mix the teachings of Berkey with that of Bernasson or comparisons with the present invention. All of Berkey's teachings deal with modifying the single-mode core, typically on the order of 8-10 μm in diameter. It could never be used as an illuminating fiber, because its cladding is at least 40-55 μm thick. Also for most single-mode fibers, which are silica based, the core is doped with refractive index raising elements such as Germanium or Cerium. Most

commonly for multimode fibers the cladding maybe as thin as 5-10 μm. and often the core material is pure silica, i.e. undoped. The techniques described/taught in Berkey will not work in standard multimode optical fibers, because they cannot have their dispersion regulated/controlled by the same mechanisms applied to single-mode fibers. Optical fiber engineers and designers understand that sideward leakage and thus illumination is not truly, economically feasible with the thick claddings needed for single-mode fibers. For these many reasons those skilled in the art of optical fibers would not look to Berkey to teach anything compatible with multimode fibers.

Kouichi et al. deal with optical fibers made from synthetic resins, and teach about introducing new monomeric species into a pre-polymerized rod to obtain a useful optical fiber in a polymeric material. Basically they propose an alternative to having to mix monomeric components and then keep their relative concentrations across a cross section uniform for long lengths of fiber which is formed by polymerizing the mixture. In Kouichi the main monomer is produced and formed into a rod which can then be exposed to the second monomer and under controlled diffusion and polymerization conditions cause the final product to have a cross-sectional refractive index profile which makes the final product a useful optical fiber. Furthermore the main teachings are aimed to produce useful, low loss optical fibers based on synthetic resins instead of silica or other inorganic materials. Nothing is taught about how to purposely degrade the optical properties to get leaky, i.e. poor transmission, optical fibers such as the fibers of the present invention. Partially diffusing optical fibers are considered by those skilled in the art of optical fibers to be generally a flawed product and to be avoided. As a consequence those skilled in the optical fiber art would not look to patents, articles or other teachings in which the goals are aimed at making superior or better optical fibers. Kouichi et al.'s invention, as noted in the abstract, is "According to this invention, a light transmitting article of synthetic resin is produced continuously in good quality." Inputted light is transmitted well to the output end with minimal loss through the fiber. This is diametrically opposed to the aims and functioning of the present invention. The combination of Kouichi et al. and Bernasson do not teach anything pertinent to the production of partially diffusing optical fibers and thus do not make obvious the present invention.

The present invention is also not obvious because there is no suggestion or motivation to combine the cited references. The cited inventions all purport to solve very different problems and do so in distinct ways. Bernasson is concerned with creating fibers that are illuminating (as is

the present invention), but Berkey is concerned with fibers that manage dispersion to improve transmission. Kouichi is concerned with creating good transmitting optical fibers having gradient refractive indices. Kouichi provides no mention of illuminating fibers. One skilled in the art would not look to processes concerned with the above problems to improve a method for creating illuminating or partially diffusing optical fibers. Thus, because for those skilled in the art there is no suggestion or motivation to combine the above references, the present invention is not obvious.

As to the comments identifying three independent inventions, first claims 13-14 claim a product only as made by the manufacturing method of claim 1. As described above and known to those skilled in the art of optical fiber manufacture, there are significant differences in a partially diffusing fiber produced in-line, i.e. during drawing from a preform, versus one modified off-line. Since the product claims explicitly exclude modified fibers produced other than in-line, the process/method invention and the product which is produced are directly related. The described method described produces the partially diffusing optical fiber not any other kind of fiber, thus the product and process are uniquely tied to each other. With the clarifying/restricting amended wording of the currently amended claim 15, the same arguments apply to making the use of a product uniquely made by the method of claim 1 and tie amended claim 15 in unity with the product and method claims as claimed.

With these changes and remarks it is believed that the disclosure is now in condition for allowance. Reconsideration is respectfully requested. An early and favorable response is earnestly solicited. Thank you.

Respectfully submitted,

Dated: October 22, 2003

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